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The Serum Diagnosis of Pregnancy.

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THE formation of ferments in the blood after the introduction of foreign substances from without forms the basis of the two tests devised by Abderhalden for the diagnosis of pregnancy. He called attention to the existence of such ferments in the year 1906, and since then has elaborated methods for their detection, and utilized these for the diagnosis of various conditions. Recent advances in our knowledge of the assimilation of digested foodstuffs from the alimentary canal have brought to light the fact that only those bodies which constitute cellular tissue are normally taken up into the blood-stream, and utilized by the body cells. The introduction of foreign materials from the alimentary tract excites ferment changes in the blood which have a special character. An example of such a change is provided when cane sugar is introduced into an animal parenterally. There is an increase in the ferment invertin which destroys cane sugar, as this would otherwise be excreted unchanged. Proteins of the higher molecular types, when introduced either subcutaneously or intravenously, similarly excite the production of a proteolytic ferment which rapidly destroys them. The same observation applies to the increase of fat splitting power of the serum after an excessive absorption of fat from the intestine.

It will be seen therefore that not only does the foreign body give rise to the ferment production, but the ferment so produced has a specific nature. Abderhalden, working upon this basis, has devised methods which are applicable to other normal and pathological conditions, and the earliest investigations were made upon the diagnosis of pregnancy. The two tests known respectively as the optical method, and the dialysation method, have been subjected to a very

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thorough examination in the hands of Abderhalden and his co-workers in Germany, and an extensive literature has already accumulated upon this subject. In the present communication I propose to confine myself to giving an account of the methods and also the observations made in improvement of technique. Dr. Williamson has already given an account of the value of the tests from the clinical standpoint (p. 211), and I would here express my indebtedness to him for providing me with some of the cases, and also for the interest he has taken in the work.

The Optical Test.

The growing placenta is regarded as the agent providing the foreign protein substances which excite the production of a protective ferment in the maternal blood-stream. Owing to its proteolytic nature we are enabled to recognize the breakdown products, and these are the essential factors in both the tests that are to be described. The materials necessary are, first of all, the blood-serum of the patient to be examined, and a supply of fresh human placenta. The optical test requires the use of a good polarimeter capable of giving readings below 0·01°, and in addition special polarimeter tubes for maintaining a constant temperature. After some practice the readings are readily made, and differences of rotation determined. The material used for the substrate upon which the ferment in the serum of pregnant women acts is a solution of placental peptone. This is prepared by the digestion of placental proteins with acids, the hydrolysis being allowed to proceed to the stage of peptones, and then arrested. The placental peptone is prepared as follows: Fresh human placenta is carefully washed free from blood with salt solution, and then thoroughly macerated. The residue is then treated with sulphuric acid, and allowed to remain at room temperature for four days. The acid slowly hydrolyzes the proteins present, and this change is on the fourth day arrested by the addition of several volumes of distilled water. The sulphuric acid is then removed by the quantitative addition of baryta water and the resulting dense white precipitate removed by filtration. This barium sulphate precipitate is ground up in a mortar with distilled water, and the decanted and filtered extracts collected. The extracts must now be carefully freed from all traces of acid, or barium hydrate, as otherwise the hydrolysis would proceed further, and the yield of peptone be diminished considerably. The extract is now concentrated in a large distilling flask heated over a water bath, and in order to prevent frothing the peptone mixture is introduced in small quantities at a time. A thick syrup possessing a yellow colour finally results, and this is dissolved up in warm methyl alcohol. The placental peptone may then be thrown out of solution by absolute alcohol as a fine yellow powder, which is readily soluble in

water. For the polarimeter test, a 5 per cent. solution of this peptone in salt solution is used, and this is placed in a sterile flask and kept sterilized ready for use. All the materials used throughout the work are also sterilized.

Into the polarimeter tube 1 cc. of the placental peptone solution is placed, and 1 cc. of the clear serum to be tested. The remaining space is filled with salt solution, and the tube is now ready for insertion into the polarimeter. The solution always shows a lævo rotation, and the actual rotation is noted. The tube and its contents are now placed in an incubator at 37°C, and at the end of one hour another reading made. The tube is replaced in the incubator and examined at intervals of from six to eight hours, the examinations not extending beyond forty-eight hours in all. As far as possible it is advisable to use the same volume of the serum in every test, and the size of the polarimeter tube must not be altered, as otherwise comparable results are not obtained. The splitting of the placental peptone into amino acids produces an alteration in the optical activity of the solution, and the amount of rotation gives an indication of the activity of the ferment present in the serum. A difference of rotation below 0·05° is disregarded, the serum of pregnant women usually producing a rotation of at least 0·2° and even higher.

The Dialysation Method.

The optical method has been proved by Abderhalden to demonstrate the presence of a specific ferment in the blood of pregnant animals. The dialysation method has consequently been devised to detect the end products resulting from the splitting of placental protein outside the body. For the dialysation test a preparation of placental tissue is required, and this is prepared in the following way: A fresh placenta from a normal case of labour is obtained and carefully cleaned with water or saline. The fœtal surface and also the membranes are cut away, and the remaining tissue cut up in small pieces and washed in running tap water until every portion is quite white. This washing is absolutely necessary as the placental tissue must be quite free from blood before use. The pieces of tissue are then placed in a large basin containing about ten times their volume of distilled water and two drops of glacial acetic acid, and are then thoroughly boiled for ten minutes to coagulate the proteins present. The coagulated placental albumen is thoroughly washed with cold distilled water, and then again boiled in the same volume as before. The water is now tested with the ninhydrin reagent to determine whether any dialysable substances are still present in the placental tissue, as these would produce a serious error and completely invalidate the test. The ninhydrin test is made upon 10 cc. of the water with 0·2 cc. of a 1 per cent. solution of ninhydrin, the mixture being boiled for one minute. A positive test points to the presence

of dialysable substances, but in most cases these are usually absent at this stage. The tissue is again washed in distilled water, and then heated with five times its volume of distilled water. In order to detect even smaller amounts of dialysable substances 5 cc. of the water is tested with 1 cc. of ninhydrin solution, the test being frequently positive with this amount. The distilled water generally contains small fragments of placental tissue, so that before applying the ninhydrin test to any sample of the washings, it is first of all necessary to filter. When the ninhydrin test proves negative the placental tissue is placed in a glass vessel containing chloroform water and covered with a layer of toluol, and stored in a cool place until required. The tissue before actual use in a test is again subjected to boiling in five times its volume of distilled water until a negative ninhydrin reaction is obtained. It is only in this way that we can exclude dialysable substances in the placental preparation which interfere with the test. The writer has also found it necessary to make fresh preparations of placental tissue at frequent intervals as the stock material cannot always be relied upon. The placental tissue is obviously one of the most important factors in the test and the greatest source of error. Hence the necessity for exercising the utmost care during the steps in its preparation. The dialysers used in the test are those specially prepared by Schleicher and Schüll, and labelled No. 579A, the size most suitable for ordinary use being 16 by 50 mm. These dialysers are allowed to soak in distilled water containing toluol for some days and then tested as to their capability of separating peptones and amino acids from colloidal substances. For this purpose a preparation of peptone is required, that used by Abderhalden being the "seiden" peptone.

The writer has used a peptone solution made from "Darby's fluid meat." Five cubic centimetres of a 0·1 per cent. solution of "seiden" peptone are placed in a dialyser tube, and surrounded by 20 cc. of distilled water, contained in a special glass vessel, all the materials being previously sterilized. The vessel is then placed in an incubator for sixteen to twenty-four hours, and then 10 cc. of the dialysate tested with 0·2 cc. of a 1 per cent. solution of ninhydrin. A dialysing tube giving a moderate blue colour is accepted as reliable, those giving either a very strong reaction or a negative result being discarded. After passing this test they are carefully washed in distilled water for some weeks and tested in the same way with serum albumen or egg albumen, only those giving a negative ninhydrin test being used. The dialysers can be used repeatedly, provided they are subjected to careful washing after each test, and stored in distilled water containing toluol as a preservative. The glass vessels used for the test are provided with ground glass stoppers and are easily sterilized. They should be of such a size that when the dialyser is in place there is a space of ½ cm. between the dialyser

and the vessel wall. For the test the glass vessel contains 20 cc. of sterile distilled water covered with a layer of toluol. The serum for the test is obtained in the same way as described for the polarimeter test, and must be quite fresh, as the slightest hæmolysis in the serum is sufficient to produce an erroneous result. The removal of 10 to 15 cc. of the patient's blood from the median basilic vein when carried out with the usual precautions and the transference of the blood directly into a sterile centrifuge tube, generally avoids these sources of error. Since the blood serum may contain dialysable substances in the form of amino acids after meals, it is always advisable to remove the blood on an empty stomach. The writer has also found it preferable to take the blood in the evening, as the dialysable substances tend to be reduced in amount when the body is fatigued. The ninhydrin reagent (triketohydrindene hydrate) is now manufactured and sold in 0·1 grm. tubes, in the form of a yellowish coloured salt, which is readily soluble in water giving a colourless solution. The solution used in the dialysation test is made up to a strength of 1 per cent. This compound reacts with any amino compound, where the amino group is in the α position to the carboxyl group, and the resulting condensation compound possesses a violet colour. The ninhydrin solution should be kept in the dark, and properly sealed, as the reagent rapidly deteriorates; and, further, it is advisable not to keep the solution longer than one week.

Method of Applying the Dialysation Test.

A series such as the following is made up in carrying out the test for the diagnosis of pregnancy:—

(1) Serum of patient (1 cc.).
(2) Serum of non-pregnant woman (1 cc.).
(3) Heated placental tissue (about 1 grm.).
(4) Heated placental tissue + 1 cc. serum of patient.
(5) Heated placental tissue + 1 cc. serum of non-pregnant patient.
(6) Heated placental tissue + 1 cc. serum of patient, heated to 60°C for 30 minutes.

In the actual tests 1 cc. of serum is placed in a properly tested dialyser together with a small quantity of the placental tissue, and the dialyser surrounded by 20 cc. of sterile distilled water, toluol being added to both. The whole series of tests as given above are placed in the incubator at 37°C., and allowed to remain for sixteen to twenty-four hours. At the end of this time they are taken out and the dialysates examined separately with the ninhydrin reagent. During the earlier stages of this work the biuret test was used to demonstrate the presence of peptones in the dialysate, but since the introduction of the much more delicate reagent of Ruhemann known as ninhydrin, the former test has been discarded. To carry out the biuret test a solution, possessing only

a faint-blue colour, made up from a 30 per cent. solution of sodium hydrate, and a very dilute solution of copper sulphate is used. The solution is placed in a reagent glass, and the addition of the dialysate produces a blue ring at the junction of the fluid. Test No. 4, however, should always give a reddish-violet colour indicating a positive reaction.

The ninhydrin test, on the other hand, owing to its extreme delicacy, requires much more careful manipulation, and, further, is full of many pitfalls. Ninhydrin, or triketohydrindene hydrate, when heated with peptones and amino acids, forms condensation compounds which possess an intense blue colour.

The sensitiveness of this reagent depends upon the concentration of the reacting substances present, and will show the presence of the amino acid glycine in 1 part in 65,000 of water, and 1 part of the other amino acids in 15 to 25,000 of water. Further, every protein and protein-containing material will, on dialysis, give this test—*e.g.*, fresh milk, saliva, urine, blood plasma, lymph, sweat, fresh and boiled egg white, fresh and cooked meat, although containing no biuret yielding bodies. From this list of substances alone it will be clear that all proteins must be purified by dialysis before use. Further, the materials used in the test must not be handled with the fingers, and pipettes must not be placed in the mouth, owing to the danger of contamination with the sweat and saliva respectively. Since hæmoglobin is a diffusible protein when free it follows that hæmolysed serum cannot be used for the diagnosis of pregnancy.

The solution is made up in distilled water to the strength of 1 per cent., and it is advisable to use moderately fresh solutions as the reagent does not keep well. To carry out the test 10 cc. of the dialysate are placed in a clear sterile boiling tube, and 0·2 cc. of ninhydrin solution added. The mixture is then boiled for one minute, a boiling stick being inserted to prevent frothing. A positive result is indicated, when the solution assumes a blue colour. Carried out in this way the dialysation method gives results which always confirm the optical tests, and provided attention is paid to the details of technique, the test is of value in the diagnosis of pregnancy. Alone, however, the test cannot be said to be of absolute value, as there are still fallacies over which we have no control. As shown above, the sensitiveness of the reagent depends upon the concentration of the reacting substances. Now, if we assume that one unit of substance is required to give the blue colour, the dialysate from the serum of pregnant women must contain one unit or above to give a positive test. In the crucial test we are using two materials, namely, serum and placental extract. The serum alone may only contain 0·5 unit, and so give a negative reaction when dialysed alone, and similarly the placental tissue may yield 0·5 unit. When, however, the two are mixed together one unit of dialysable substance

is obtained without any actual ferment changes taking place, and a positive test results. Again a serum which has been obtained after a meal will contain an increase of diffusible substances, as much possibly as 0·9 unit, and this, when mixed with the placental tissue, will also give a positive test. Such results have been met with, and a number of experiments have been made in an attempt to eliminate this error. To a certain extent this possible source of error is overcome by inactivation of the serum, as in experiment (6) in the series given above. All that can be said at present is that certain definite rules must be laid down before applying the test. In the first place, the patient must have abstained from food at least four hours previously, and the blood is best taken late in the day, as when the body is fatigued the blood contains less of these diffusible substances giving the ninhydrin reaction. The placental tissue also requires careful preparation, and particularly long-continued dialysis before use.

The sensitiveness of the ninhydrin reaction depends upon the concentration of the dialysate, and also of the reagent itself. The dialysate from all the tests therefore requires boiling for exactly one minute, and the same gas flame must be used so that evaporation is constant in all. The best method of checking this is to use specially graduated test tubes for the ninhydrin test, and the amount of fluid left in each tube after boiling should be compared.

That placental tissue plays a prominent part in the production of a protective ferment has been proved conclusively by Abderhalden, by a number of animal experiments. The serum of a pregnant animal can be inactivated by heating to 60°C., thus demonstrating that the ferment is destroyed by exposure to this temperature. The serum of the fœtal blood, and fœtal tissue also, does not contain this ferment. An extract of human placental tissue in salt solution, and also human placental peptone, was injected into dogs, rabbits, and guinea-pigs, either intravenously or intraperitoneally, the blood serum of normal animals mixed with placental peptone being also used. In the case of the dogs, two injections of 1 grm. of placental peptone were given on successive days, and the blood collected eight days afterwards, and the serum tested against placental peptone by the optical method. In every case a breakdown of the placental peptone occurred. The rabbits received four intravenous injections of 2 to 3·5 cc. of placental extract, and six days afterwards the serum when tested gave a similar result. The same changes occurred in guinea-pigs after injections of 0·6 cc. of placental extract into a shin vein. These results conclusively proved that a ferment is present in the blood serum of pregnant animals, and capable of detection by the optical method. The presence of this ferment in the blood-stream was further demonstrated by dialysis.

The results obtained when using these methods of Abderhalden

tend to demonstrate that the tests are of great value, provided the technique is perfect. The clinical notes of some of the cases which I have examined with a view to assisting in the diagnosis of pregnancy have been given by Dr. Williamson, so that it is unnecessary to refer to them here. My chief object is to demonstrate the tests as carried out, and to show that when the technique of the observer has been perfected the results obtained justify the labour expended. During the past eighteen months I have been engaged in subjecting this test to a thorough examination and perfecting my methods. The test appears to be of value, more especially in the following conditions:

(1) The early diagnosis of pregnancy.
(2) The differential diagnosis between fibromyomata and pregnancy.
(3) The diagnosis of chorionepithelioma.

In cases of fevers and in patients with cachexia, the serum probably contains an increased amount of dialysable substances, and this may lead to a source of error. The two cases of tuberculous pyosalpinx (Cases iii and v, pp. 213 and 214) probably owe their positive dialysation tests to such substances present in the serum, and then, fortunately, the optical test was not applied in these two instances.

A New Form of Pelvigraph.

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In his *Treatise of Midwifery*, Robert Barnes has eloquently summed up the great problem of labour in the following words:—"If we could obtain approximately exact measurements of the dimensions of the pelvis in a gravid, especially a parturient woman, we should have solved one part of the great problem of obstetrics. If we could also take accurate measure of the dimensions of the fœtal head still *in utero*, and be at the same time able to estimate the degree of its plasticity, we should be in possession of the two primary factors absolutely and in their relations to each other. If, thirdly, we could accurately gauge the driving force brought to bear upon the two first factors, allowing for the resistance of the soft parts, we should almost realize the proposition of Levret that 'labour is a natural operation, truly mechanical, susceptible of geometrical demonstration.'"

Much ingenuity has been applied to the solution of the problem but very little real advance has been made. Numerous and complicated instruments have been introduced either for measuring the diameters of the pelvis and fœtal head or estimating the strength of the uterine contractions, but their practical application has been so difficult and the results obtained so untrustworthy that nearly all have been abandoned in favour of more practical if less scientific methods.

During the past year I have been making observations on the size of the pelvic cavity with an instrument which, although somewhat complicated, has given satisfactory results in my hands; and it is with its description and method of application that the present article is concerned.

On looking through the literature of the subject, I have been unable to find any method described which will give such complete results with so little discomfort to both patient and examiner.

Martin's pelvigraph, introduced in 1827, was based on the same principle, but intended for use in the dry pelvis, and even then only gave approximately accurate results.

The principle of the instrument may be briefly described as follows:—

Two rigid metal arms are connected together by a pair of cross-bars in such a way as to allow free movement in the vertical plane, both arms remaining parallel throughout and moving synchronously with one another.

A pivot-joint is fitted to one of the cross-bars, and connects this portion of the instrument to a metal stand provided with a weighted footpiece and having a vertical draughting-board attached to it.

To the extremity of one arm is fixed a pencil, and this, travelling over the draughting-board, records the position at any moment of the other arm which is passed into the vagina and placed upon any part of the anterior or posterior pelvic walls.

An exact reproduction of the contour of the pelvic cavity in the median plane can thus be obtained and the various diameters accurately estimated. (Plate 1.)

The Instrument described.

The internal or exploring arm is divided into two portions in order that the part which has to be introduced into the vagina may be thoroughly sterilized.

The distal or vaginal portion is eight inches in length and consists of a curved metal rod provided at its tip with a rounded knob a quarter of an inch in diameter, the other extremity being square on section and fitting into a socket in the proximal part of the arm. (Plate 2, Fig. 4.)

Near this end is a joint which allows the rod to revolve around the axis of the proximal portion, and, as the terminal knob lies in the same axis, the position of its centre is not affected by the movement (B).

Immediately below the knob is attached a finger ring which is freely movable around its own axis, and also that of the part of the rod to which it is fixed (A).

The vaginal portion of the arm is so curved that its tip may be placed upon any point of the anterior or posterior pelvic walls, whilst the rotary joint enables the same arm to be used throughout the examination.

The proximal portion is three and a half inches long and has attached to it two parallel bars connecting it with the registering arm and allowing free movement in the vertical plane. Its distal end is expanded and provided with a socket to receive the vaginal portion, the latter being firmly fixed in this position by means of a thumb-screw (Plate 2, Fig. 1A). The parallel bars are eight inches long, one and a half inches apart, and lie in the vertical plane, their extremities being connected by movable joints to the exploring arm below and the registering arm above. They remain parallel to one another in all positions of the instrument, and being of equal length, it follows that the arms to which they are attached are also parallel.

The posterior bar is provided with a circular opening at the junction of its upper and middle thirds, and this forms part of the pivot joint connecting this portion of the instrument to the stand. The joint is made very accurately in order to allow of movement in

one plane only and can be tightened up or loosened as desired (Plate 2, Fig. 3).

The registering arm, five inches long, is attached below to the parallel bars, and has at its distal extremity a circular opening provided with a thread into which is screwed the special pencil-holder (Plate 2, Fig. 2).

The latter is somewhat complicated because it is essential that the writing point should be equally capable of being firmly applied to the chart or easily removed therefrom without interfering with the accuracy of the instrument.

The pencil-holder consists of a metal screw one inch in length and surmounted by a large milled head. The screw is hollowed out and has a metal case half an inch long attached to its lower extremity. Within this case lies a thin metal rod one and a half inches in length and provided with a shoulder at the junction of its middle and lower thirds, the lower third being hollowed out to receive a wooden pencil one inch long and a quarter of an inch in diameter. A spiral spring surrounds the upper two-thirds of the rod, resting below upon the projecting shoulder, whilst above it is compressed against the lower end of the screw. As the latter is attached to the registering arm, the action of the spring is directed downwards and has the effect of keeping the pencil firmly applied to the paper.

The pencil-holder is withdrawn from the draughting-board by turning the screw to the left, this being easily done without disturbing the other parts of the instrument. In the same way, the pressure of the writing-point on the paper can be carefully regulated so that there is no unnecessary friction and the lines are drawn with sufficient emphasis.

The arms and parallel bars have been made with great care in order to ensure mathematically accurate results so far as the working of the instrument is concerned.

It will be noted that the exploring arm is twice the length of the registering arm and that the pivot-joint is placed at the junction of the upper and middle thirds of the parallel bar; consequently any movement of the exploring arm within the pelvis is accurately reproduced on the chart, the scale being one-half.

Again, the centre of the knob is taken as the actual extremity of the exploring arm in order that any part of its surface may be used for locating the various points within the pelvis. A correction is therefore necessary, and consists in adding a quarter of an inch to all the diameters measured on the chart.

The stand of the instrument is divided into two portions—an upper and a lower, the latter consisting of a heavy triangular foot-piece to which is attached a hollow vertical stem seven inches in length and one inch in diameter.

The upper portion which fits into this and can be fixed at any required height by means of a large screw, consists of a stout metal rod seven inches long and three-quarters of an inch in diameter which has jutting out at right angles from its upper end a horizontal branch three and a half inches in length, the extremity of which forms part of the pivot-joint connecting this portion of the instrument with the parallel bar.

A draughting-board seven inches square and fixed perpendicularly to this branch lies parallel to the plane of the two arms, and has a sheet of paper attached to it when the instrument is in use.

In later experiments I have discarded the weighted footpiece in favour of a metal tripod of convenient size. The instrument can be fixed at any height by means of a screw, and being easily moved about and perfectly rigid, is much more convenient for hospital use.

The Practical Application of the Instrument.

The special advantage which this instrument possesses over any yet described lies in the fact that a continuous outline can be obtained of the anterior and posterior walls in the mid-plane of the pelvis.

This gives a very clear idea of the configuration of the pelvic cavity and the length of any of its antero-posterior diameters. In addition, the height and inclination of the symphysis and any alteration in the curve of the anterior surface of the sacrum are accurately demonstrated.

The method is carried out as follows:—

The patient is placed in the lithotomy position at one side of a hard bed or couch, her ankles being supported in the usual crutches. It is advisable that the rectum should have been emptied by a preliminary enema in order that it may be possible to reach any point on the anterior surface of the sacrum.

A catheter is now passed and the bladder thoroughly emptied. If this is done efficiently there will be no difficulty in applying the tip of the vaginal arm to any part of the posterior surface of the pubic symphysis.

The operator, having prepared his hands as for an ordinary obstetric examination, thoroughly cleanses the vulva and surrounding skin and makes a careful digital examination of the pelvic cavity in order to locate accurately the various bony points.

The instrument, preferably fitted to the tripod, is then placed at a convenient height in front of the patient, and in such a position that the arms lie in the mid-pelvic plane.

Having fitted the sterilized portion of the exploring arm into its socket, the operator passes his middle finger into the ring provided for it, the tip of the finger being closely applied to the terminal knob (Plate 3), and carries this portion of the instrument on to the sacral

promontory (Fig. 1). When this point is reached, the pencil is screwed up and the vaginal arm moved down the anterior surface of the sacrum and coccyx, the terminal knob being kept firmly applied to these bones. This causes no discomfort to the patient if the internal arm be well lubricated, as the knob is of sufficient size to move freely over the vaginal walls.

When the tip of the coccyx is reached the writing point is withdrawn and the vaginal arm rotated and brought up against the upper border of the posterior surface of the symphysis when the pencil is again screwed up and the arm drawn down behind the pubes until its lower margin is reached (Fig. 2).

A complete picture of the median pelvic plane has now been obtained, but before removing the instrument it is advisable to replace it upon some of the points so that their position may be confirmed and the accuracy of the instrument thoroughly tested. The exact position of the sacro-coccygeal joint is to be indicated in this way (Fig. 3).

The pelvigraph is now withdrawn and the chart removed for inspection, lines being drawn upon it representing the various antero-posterior diameters.

The transverse diameters of the pelvis may be obtained in a similar manner, the method being as follows:—

The patient lies across the bed in the left lateral position and in such a way that her ischial tuberosities lie in the vertical plane. The instrument is arranged as before and the internal arm passed into the vagina and carried on to the most distant (lowest) point of one ilio-pectineal line, the stand being moved about until this point is accurately located. A mark is now made upon the chart and the arm rotated and applied to the corresponding point on the opposite side. A second mark is made with the pencil and a line drawn between them represents the transverse diameter of the pelvic inlet.

The corresponding diameters of the outlet are obtained in exactly the same way, the terminal knob of the vaginal arm being applied to the inner surface of each ischial spine or tuberosity as the case may be.

In order to obtain accurate results with any of the preceding methods, it is absolutely essential that the patient should remain perfectly still during the examination, and if this be impossible a general anæsthetic must be administered. Several observations may be taken at one sitting, however, and with very little extra trouble, so that errors can be readily detected and easily eliminated.

The method is no doubt complicated and therefore of very limited application, but in a maternity hospital where large numbers of cases of contracted pelvis are met with it is useful to have some means whereby permanent records may be obtained, as these are of con-

siderable value for teaching purposes or for future reference should the particular patient return for subsequent treatment.

Plate 1. General view of the Instrument.

Plate 2. The Instrument in Detail. Fig. 1 : The Arms and Parallel-Bars. Fig. 2 : Pencil-Holder. Fig. 3 : Pivot-joint. Fig. 4 : Vaginal Portion of Exploring Arm.

Plate 3. The Vaginal Arm applied to Fig. 1 : Sacral Promontory; Fig. 2 : Symphysis Pubis; Fig. 3 : Sacro-Coccygeal Joint.

Plate 4. Tracings obtained with the Pelvigraph. Fig. 1 : Normal Pelvis. Fig. 2 : Contracted (Flat) Pelvis. Fig. 3 : Funnel-shaped Type.

The instrument has been made for me by Messrs. Mayer and Meltzer, of London.

Plate I.

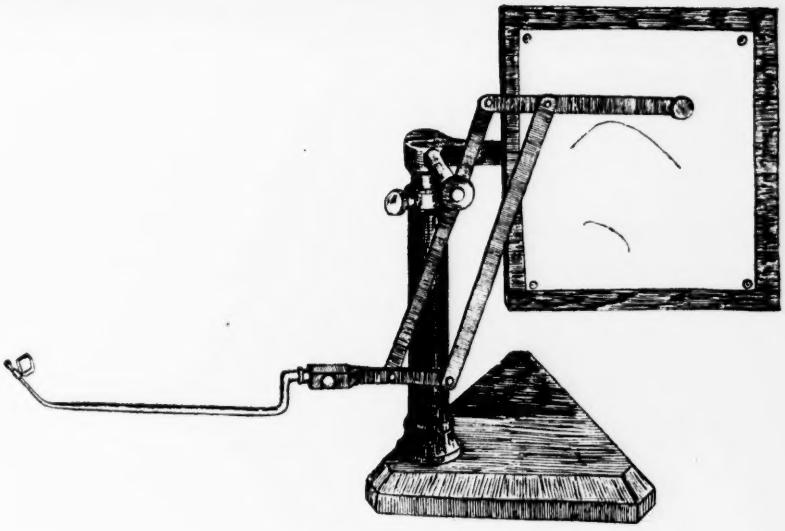


Plate II.

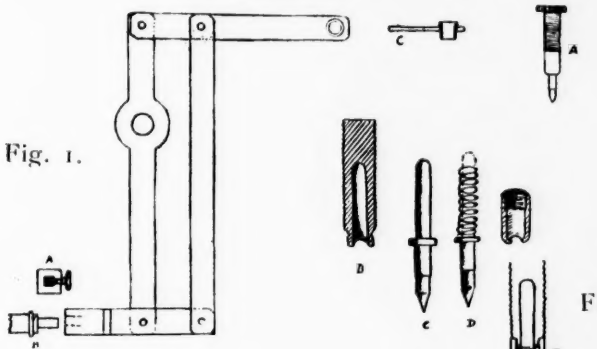


Fig. 1.

Fig. 2.

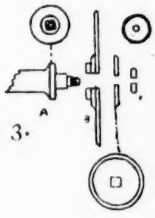


Fig. 3.

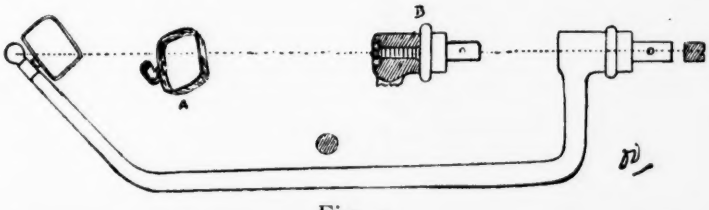


Fig. 4.

Plate III.

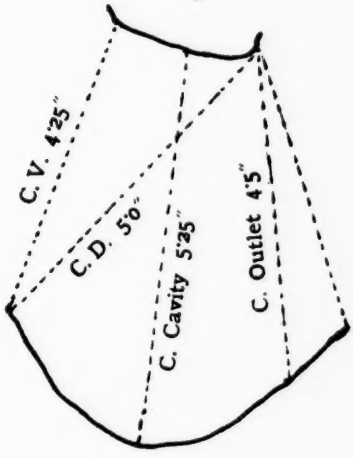
Fig. 3.

Fig. 2.

Fig. 1.

Plate IV.

Fig. 1.



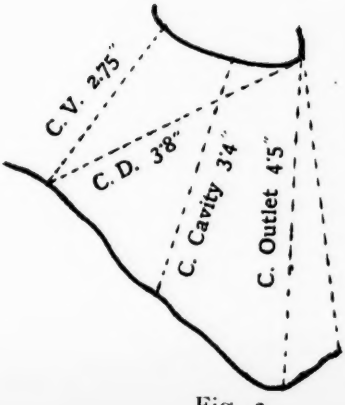


Fig. 2.

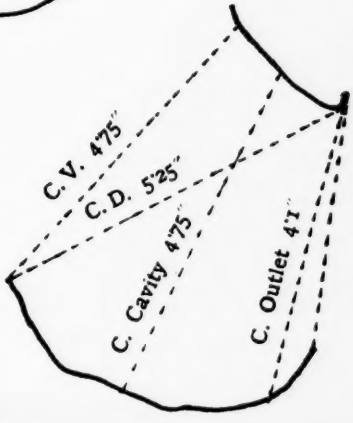


Fig. 3.

Some Observations on Pelvimetry.

By Daniel Dougal, M.D.,

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In the present number of this Journal[1] I have described a new pelvigraph, by means of which it is possible to obtain accurate tracings of the median plane of the pelvis in the living subject and so estimate the length of the various antero-posterior diameters.

The internal measurements discussed in the present article have been obtained in this way, and serve to illustrate the limitations of the various indirect methods of pelvimetry.

In all, 119 pelves were examined—100 in the living subject and 19 dry specimens from the valuable collection in the Radford Museum of St. Mary's Hospital.

In the living subject most of the measurements were taken during pregnancy or the puerperium, but a certain number were obtained in labour, these being cases where some obstetric operation was performed and an anæsthetic administered.

In considering the various measurements, I have employed the averages obtained from them in order to make the results more readily understood, but it is necessary to point out that the pelves examined do not form a normal series, as they include an unusually large number of cases of pelvic deformity. This is especially so in the case of the dry specimens which consist largely of examples of extreme contraction of one or other type.

Thus, the amount of deformity as indicated by the length of the true conjugate is as follows:—

Dry pelvis (19 specimens).

True conjugate measures 4″ and over in 5 cases.
,, ,, ,, 3″ ,, 3 ,,
,, ,, ,, 2″ ,, 7 ,,
,, ,, ,, 1″ ,, 4 ,,
Percentage of deformity 73.

Living subject (100 cases).

True conjugate measures 4·0″ and over in 49 cases.
,, ,, ,, 3·5″ ,, 28 ,,
,, ,, ,, 3·0″ ,, 19 ,,
,, ,, ,, under 3″ in 4 cases.
Percentage of deformity 51.

Looking at the same series from the point of view of obstetric treatment, the result is as follows:—

Delivery by natural forces	54	cases.
,, forceps	14	,,
,, induction	7	,,
,, craniotomy	1	,,
,, Cæsarean section	17	,,
Nulliparæ	7	,,

Nevertheless, the cases give much useful information as to the relative size of the various pelvic diameters, and it is with this aspect that the present observations are chiefly concerned.

The True Conjugate.

This diameter being the one most frequently affected in pelvic deformity, has been the subject of infinitely more investigation than any of the others, and most of the methods of pelvimetry have been solely devised for its more or less accurate estimation.

In the pelves I have examined the measurement has been obtained directly from the tracings and represents in the pelvis the distance between the sacral promontory and the nearest point on the posterior surface of the symphysis pubis.

Previous to the work of Michaelis,[2] the anatomical conjugate was regarded as the most important antero-posterior measurement of the pelvic inlet, but this author found that there existed a smaller diameter, namely, that which is now known as the obstetric or true conjugate.

Pinard [3] called further attention to this measurement and termed it the diamètre minimum or diamètre utile.

In 19 dry pelves examined, the largest measurement of this diameter was 4·9″, the smallest 1·25″, the average being 3·75″.

In the living subject, 100 cases, the highest measurement obtained was 5·0″, the lowest 2·5″, average 3·84″.

In actual practice it is exceedingly difficult to measure this diameter directly without the aid of some complicated instrument; consequently its length is more or less accurately obtained by deducting a certain amount from some more readily accessible diameter, such as the external or the diagonal conjugate respectively. It therefore becomes of great importance to recognize the shortcomings of these methods and not to place too implicit a trust in the results so obtained.

The External Conjugate.

This diameter was obtained by taking the measurement, as suggested by Crédé, from a point in the middle line behind, half an inch above the depressions on the skin over the posterior superior iliac spines, to the surface of the integument covering the anterior surface of the symphysis pubis.

In the living subject (100 cases), the highest measurement obtained was 8·25″ (C.V. 3·9″), the lowest 6·0″ (C.V. 3·75″, 3·2″, 2·5″, 2·6″), the average being 7·21″.

The importance of this measurement as a sign of pelvic contraction is shown by the following figures:—In 48 cases the diameter measured less than 7·0″, and in 33 of these the pelvis was contracted; in 22 cases the measurement was less than 6·75″, and in 21 of these definite contraction was present. In other words, if the external conjugate measure 7·0″ or less, the pelvis is contracted in 70 per cent., if 6·75″ or less in 95 per cent. of cases.

Baudelocque,[4] who was the first obstetrician to employ this method in midwifery, believed that the length of the true conjugate could be estimated with absolute accuracy from this diameter by means of a simple correction, and described his procedure as follows:—

"To demonstrate how much the superior strait is defective in the sacro-pubic diameter and measure it by means of the compasses, we take the thickness of the woman, from the middle of the mons veneris to the centre of the depression of the base of the sacrum posteriorly, by applying one of the points of the instrument before, against the symphysis of the pubis and the other behind, a little under the spine of the last lumbar vertebra; and deduct 3·0″ from that thickness in women who are thin, for the base of the sacrum and the anterior extremities of the ossa pubis; the thickness of these latter being at most six lines and that of the base of the sacrum 2½″; and so constantly so that I have not found a difference of a line in about five-and-thirty pelves distorted and contracted in all manner of ways and in all possible degrees. . . . . The results of this procedure are so exact that the pelvis, measured with the common compasses after opening the body, was not above a line over or under my estimation in any one of my experiments."

Baudelocque's own method must have been much more perfect than any practised since his time, as all authorities are now agreed that the two diameters vary widely and disproportionately and bear no absolutely constant relationship to each other.

Michaelis[2] thought the diameter of considerable value, and concluded, as a result of his experiments, that the shortening of the external conjugate expressed half that of the true conjugate.

Litzmann,[5] on the other hand, considered the method exceedingly fallacious, and in thirty post-mortem examinations found the average deduction to be 3½″, but to vary widely in individual cases owing to the difference in thickness of the bones and integument.

Schroeder[6] found that the spinous processes were subject to great variation quite independently of the length of the true conjugate.

Galabin[7] considered that moderate values of the external conjugate gave little indication and found the amount to be deducted increased in rhachitic pelves.

Whitridge Williams [8] states that when the external conjugate measures between 7·9″ and 8·25″ the true conjugate is rarely shortened, between 7·0″ and 7·5″ it is shortened in 50 per cent., and when below 6·75″ contraction in this diameter is almost always present.

My own measurements give very similar results to those of the last-named author, and prove that the length of the external conjugate, as an indication of pelvic contraction, gives very doubtful information unless its difference from the normal be considerable.

In the living subject, the greatest difference between the two diameters was 4·75″ (C.V. 2·75″), the smallest 2·25″ (C.V. 3·75″, 4·74″), the average being 3·37″.

When the true conjugate measured 4·0″ or over, the amount to be deducted from the external conjugate varied from 2·25″ to 4·0″, although the commonest figure lay between 2·75″ and 3·75″; where the true conjugate measured 3·5″ or over, the amount varied from 3·0″ to 3·9″, the figure being most commonly between 3·25″ and 3·74″; with the true conjugate under 3·5″, the difference lay between 3·25″ and 4·5″, although most commonly between 3·25″ and 4·0″. That is to say, the shorter the length of the true conjugate, the larger the amount to be deducted; or, in other words, the contraction of the external conjugate is always proportionately less than that of the true conjugate.

To sum up, if the external conjugate measure 7·0″ or less, the pelvis is probably contracted and almost certainly so if the same diameter measure less than 6·75″.

There is no accurate method of estimating the length of the true conjugate from that of the external conjugate, the margin of error in Baudelocque's calculation being so great as to render it useless, not to say dangerous, in practice.

Table I shows the difference between these two diameters and its relation to the length of the true conjugate.

TABLE I.

RELATION BETWEEN C.EXT.—C.V. AND LENGTH OF C.V.

Living Subject (100 Cases).

Length of C.V.	Difference between C. Ext. and C.V.									
	2·25 to 2·49	2·5 to 2·74	2·75 to 2·9	3·0 to 3·24	3·25 to 3·49	3·5 to 3·74	3·75 to 3·9	4·0 to 4·24	4·25 to 4·49	4·5 and over
2·5″—2·74″	–	–	–	–	1	1	–	–	–	1
2·75″—2·99″	–	–	–	–	–	–	–	–	–	1
3·0″—3·24″	–	–	1	–	–	2	1	–	–	2
3·25″—3·49″	–	–	–	–	5	3	1	4	–	–
3·5″—3·74″	–	–	–	2	5	3	1	–	–	–
3·75″—3·99″	1	–	1	4	2	3	3	2	1	–
4·0″ and over	2	5	6	12	11	9	3	1	–	–

The Diagonal Conjugate.

This is the most readily accessible of the internal pelvic diameters, and derives its chief importance from the fact that the length of the true conjugate is usually calculated from it. When considerably shortened, however, it gives in itself definite evidence of contraction, but the converse of this is not always true owing to variations in the height and inclination of the symphysis pubis, although many years ago Madame La Chapelle formulated the axiom "that the best proof of a good conformation of the pelvis is the impossibility of reaching the sacro-vertebral angle with the finger."

In 19 dry pelves examined the greatest measurement obtained of this diameter was 5·6″ (C.V. 4·6″), the smallest 2·0″ (C.V. 1·6″), the average being 3·83″.

In 100 cases in the living subject, the corresponding figures were 6·0″ (C.V. 5·0″), 3·25″ (C.V. 2·5″), average 4·67″.

Table II shows the various measurements of the true conjugate obtained in the dry pelvis and living subject respectively, together with the relationship which they bear to the diagonal conjugate.

TABLE II.

Relation between C.V. and C.D.—C.V.

A. *Dry Pelvis (19).*

Length of C.V.	Difference between C.D. and C.V. 0·25-0·49	0·5-0·74	0·75-0·99	1·0-1·24	1·25-1·5
1·0″—1·49″ ...	–	–	–	1	1
1·5″—1·99″ ...	1	1	–	–	–
2·0″—2·24″ ...	–	–	–	–	–
2·25″—2·49″ ...	–	1	2	–	–
2·5″—2·74″ ...	–	–	–	–	–
2·75″—2·99″ ...	–	1	–	1	2
3·0″—3·24″ ...	1	–	–	–	–
3·25″—3·49″ ...	–	–	–	–	–
3·5″—3·74″ ...	–	1	–	–	–
3·75″—3·99″ ...	–	–	1	–	–
4·0″ and over ...	1	2	1	1	–

B. *Living Subject (100).*

Length of C.V.	Difference between C.D. and C.V. 0·25-0·49	0·5-0·74	0·75-0·99	1·0-1·24	1·25-1·49	1·5-174
2·5″—2·74″ ...	–	–	2	–	–	1
2·75″—2·99″ ...	–	1	–	–	1	–
3·0″—3·24″ ...	–	1	1	2	3	–
3·25″—3·49″ ...	–	4	4	3	–	–
3·5″—3·74″ ...	1	3	5	3	1	–
3·75″—3·99″ ...	–	6	7	3	1	–
4·0″ and over ...	4	16	15	9	1	2

It will be seen that in the dry pelvis the difference between these two diameters varied from 0·25″ to 1·5″; in three cases from 0·25″ to

0·49″, in six from 0·5″ to 0·74″, in four from 0·75″ to 0·99″, in three from 1·0″ to 1·24″, and in three from 1·25″ to 1·5″. Of the six cases with a difference of from 1·0″ to 1·5″, five were examples of pelvic contraction.

The difference in the living subject varied from 0·25″ to 0·49″ in five cases, 0·5″ to 0·74″ in thirty-one cases, 0·75″ to 0·99″ in thirty-four cases, 1·0″ to 1·24″ in twenty cases, 1·25″ to 1·49″ in seven cases, and 1·5″ to 1·74″ in three cases.

A correct estimate of the length of the true conjugate to within a quarter of an inch would therefore be obtained in 20 per cent. of cases by a deduction of 0·5″ from the diagonal conjugate, in 65 per cent. by a deduction of 0·75″, in 55 per cent. by a deduction of 1·0″, in 27 per cent. by a deduction of 1·25″, and in 10 per cent. by a deduction of 1·5″.

This method of calculating the length of the true conjugate is therefore open to a large margin of error, but the safest amount to deduct would appear to be 0·75″, as this would be correct to within a quarter of an inch in 65 per cent. of all cases.

The amount should vary, however, according to the type of case dealt with as the inclination and height of the symphysis have also to be taken into account.

The inclination is represented by the angle which the diagonal conjugate makes with the symphysis pubis and in the 19 dry pelves which I examined varied between 64° (C.V. 4·9″, funnel-shaped pelvis) and 13° (C.V. 1·25″), the average being 43°.

In the living subject, the largest angle obtained was 70° (C.V.4·75″, funnel-shaped pelvis), the smallest 29° (C.V.2·6″), the average being 51°. In forty-eight cases the angle measured 50° to 59°, in twenty-eight 40° to 49°, in seven 30° to 39°, and in sixteen 60° to 69°.

It is noteworthy that the largest angle obtained in each class was in the funnel-shaped variety of pelvic deformity.

Table III shows the varying size of this angle in the case of the living subject and also the influence which it has upon the relative lengths of the two conjugates, *i.e.*, the larger the size of the angle, the smaller the difference between these two diameters.

TABLE III.

Showing Relation of C.D.—C.V. to Inclination of Symphysis.

Living Subject (100 Cases).

	Angle C.D. Symph.					
C.D.—C.V.	20—29°	30—39°	40—49°	50—59°	60—69°	70—79°
0·25″—0·49″ ...	–	–	–	–	5	–
0·5″—0·74″ ...	–	1	2	16	11	1
0·75″—0·99″ ...	–	1	6	28	–	–
1·0″—1·24″ ...	–	2	17	2	–	–
1·25″—1·49″ ...	–	3	3	1	–	–
1·5″—1·74″ ...	1	–	–	–	–	–

Goth [9] has investigated this subject, and gives the average size of the angle for twenty cases as 62°, while Winkler,[10] in forty-one dry pelves, found it to measure 37° in two cases, 40° to 50° in five cases, 50° to 60° in nineteen cases, 60° to 70° in fourteen cases and 72° in one case.

By the second factor is meant the height of the anterior extremity of the true conjugate or post-pubic point, and not that of the entire symphysis pubis.

In the dry pelvis, the highest measurement obtained was 1·5″ (3 cases), the lowest 0·9″ (5 cases), the average being 1·17″.

The measurements obtained in the living subject are shown in Table IV, and varied from 2·25″ (1 case) to 0·75″ (3 cases), the average being 1·55″.

TABLE IV.

Showing Relation between Height of Symphysis and C.D.—C.V.

Living Subject (100 Cases).

	Height of Symphysis (Post-pubic Point).				
C.D.—C.V.	0·75-0·99	1·0-1·24	1·25-1·49	1·5-1·74	1·75-2·0
0·25″—0·49″ ...	2	1	1	1	–
0·5″—0·74″ ...	2	5	7	10	8
0·75″—0·99″ ...	–	2	6	14	12
1·0″—1·24″ ...	–	–	2	9	10
1·25″—1·49″ ...	–	–	–	2	5
1·5″—1·74″ ...	–	–	–	–	1

The higher the situation of the post-pubic point, the greater is the difference between the two conjugates; in my own cases, where the difference is less than 0·75″, the height of this point measures over 1·5″ in nineteen cases, and under it in eighteen cases; with a difference of more than 0·75″, the height measured over 1·5″ in fifty-two cases and under it in ten cases.

The two factors, the inclination and height of the symphysis pubis have therefore an important bearing upon the length of the true conjugate, and must be taken into account when estimating the length of this diameter from that of the diagonal conjugate.

Great difference of opinion exists as to the amount to be deducted. Michaelis recommended 0·75″ as a mean, 0·6″ when the bones were badly developed, and 0·9″ when they were strong made; he found the same average for both normal and contracted pelves, but only examined 26 of the latter.

Skutch [11] suggests as an average 0·6″, and Goth,[9] for twenty cases, gives a mean of 0·5″.

Spiegelberg [12] was the first to emphasize the importance of taking the height and angle into consideration in arriving at a correct estimate; he stated that a steep anterior pelvic wall increases, whilst a horizontal one diminishes the amount to be deducted; also, the

longer the symphysis the greater the difference between the conjugates.

Pinard [3] considers that in always deducting 0·6″, regrettable errors will be committed; he thinks the deduction ought to be proportionate with the height and direction of the symphysis, and also to a certain extent with its thickness.

Van der Hoeven,[13] in his recent work on this subject, has come to the conclusion that the indirect method of measuring the true conjugate is open to grave errors, and finds the deduction from the diagonal conjugate to vary between 0·0″ and 1·6″.

This author measured the true conjugate directly with Gauss's instrument, which he considers to be the most accurate pelvimeter yet introduced.

My own results lead me to the same conclusions as those of Van der Hoeven, but it must be remembered that the indirect method is the only one capable of general application, and when used with a full knowledge of its limitations gives sufficiently accurate results in the great majority of cases.

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A Description of the Ductless Glands from a Case of Acute Thyroid Enlargement of Pregnancy.*

By Clifford White, F.R.C.S.

The term "thyroid enlargement" is used to avoid the word "goitre" or "thyroiditis" as the exact nature of the sudden increase in size of the thyroid gland in these cases is not clear. As such cases are uncommon it may be worth while giving the history in detail.

A.T., aged 29, primipara, was admitted to University College Hospital under the care of Dr. G. F. Blacker on August 19, 1912. She had had a very small goitre for 16 years, but it had suddenly increased in size when she was six months pregnant; she was then treated in the medical wards at intervals till labour set in at full term, and was then transferred to the labour ward. When seen in the labour ward the patient was in good general condition; pulse 100, temperature 98·8°, respiration 24. There was a soft, regular enlargement of the thyroid so that the neck measured $17\frac{3}{4}$ inches in circumference; this increased to 19 inches during each labour pain. No signs of Graves' disease were present. Respiration was not seriously obstructed, but slight cyanosis was present, so that occasionally oxygen was given. The uterus was the normal size for full term. Child R.O.A.; fœtal heart 130.

On August 20 she was naturally delivered of a male child, weighing 6 lbs. 8 oz. without any special difficulty; the child was quite normal. The following day (August 21) severe bronchitis was present with marked dyspnœa and inspiratory recession of the intercostal spaces. Neck measurement given as 16 inches. The dyspnœa and cyanosis increased and death occurred the next day. An autopsy made 20 hours later showed acute bronchitis to have been present. There was no laryngeal or tracheal stenosis. The thyroid, thymus, kidneys' suprarenals, ovaries and pituitary gland were removed for investigation.

The thyroid shows regular enlargement and appears to be solid except for one cyst 3 cms. in diameter on its posterior aspect. There are no hæmorrhages into its substance. It measures 16 cms. from side to side, 12 cms. from above downwards, and $7\frac{1}{2}$ cms. from before back. The thymus forms a long tongue-shaped mass, measuring 11 by 2 by 1 cms. The ovaries are normal in size and appearance; corpora lutea are present. Suprarenals: The left measures 6 by 4 by 1 cms., and weighs 9·3 grammes. It is enlarged by a central

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adenoma. The right is normal in size and appearance, and weighs 5·5 grammes. The pituitary measures 15 by 8 by 6 millimetres.

For purposes of comparison, the pituitary, suprarenals and thyroid were sought for from a patient of about the same size, parity, and dying about the same time after labour. They were finally obtained from a primipara, aged 25, who was admitted to Queen Charlotte's Hospital on August 3, 1913, with tonic uterine contraction and died two days later from the effects of trauma following a difficult embryotomy. The glands were normal macroscopically; the pituitary measured 15 by 10 by 8 millimetres.

Histology. Numerous sections were cut from different portions of the glands. They were hardened in weak formalin and cut in paraffin. The stains usually employed were Mallory's iron hæmatoxylin with either van Giesen or orange. All the tissues give evidence of having undergone slight autolytic changes. It will be noticed that in this particular case only very slight deviations from the normal could be demonstrated in the ductless glands by the particular methods employed.

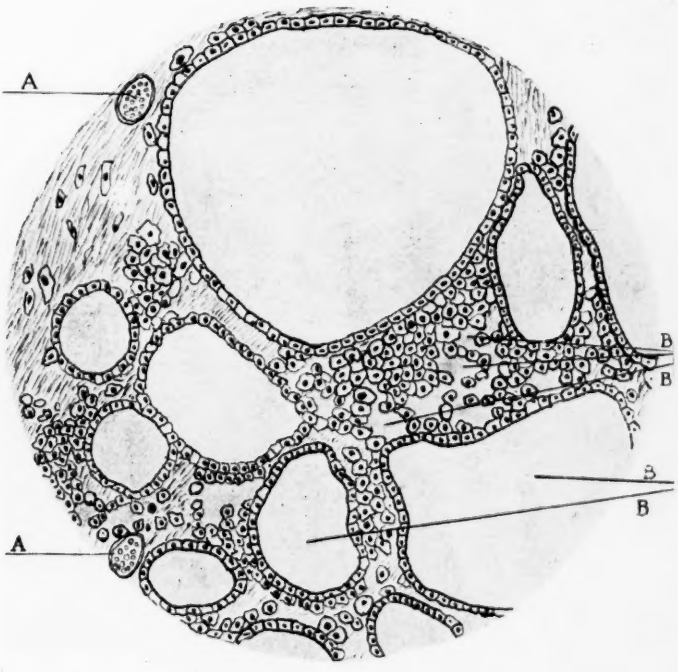
Thyroid. The alveoli vary greatly in size, in places resembling the so-called colloid goitre. They are mostly lined by a single layer of small cubical epithelial cells whose nuclei stain deeply. Where there are no normal colloid alveoli the tissue is formed of small collections of cells; these occasionally line a central cavity containing a minute quantity of colloid. These cells are more irregularly arranged and the cells and their nuclei are larger than those lining the normal alveoli. The appearance is suggestive of the rapid formation of new colloid alveoli. In sections from the control thyroid these cell masses are less frequently seen, and when present their cells and nuclei are smaller. Nowhere is there intra-alveolar cell-proliferation such as is seen in exophthalmic goitre. No increased fibrosis is demonstrable. The colloid is clear and rarely granular; it stains yellow with van Giesen's stain. Round-celled infiltration and other signs of acute inflammation are absent.

Thymus. This is normal.

Kidney. The glomeruli are normal. The cells of the tubules are swollen, as seen in cases of slight nephritis. There is no excess of fibrous tissue present.

Ovary. Owing to a defect in the hardening the finer histological details were destroyed and the exact state of the interstitial cells cannot be accurately described. Both old and recent corpora lutea are present. There is no increased fibrosis.

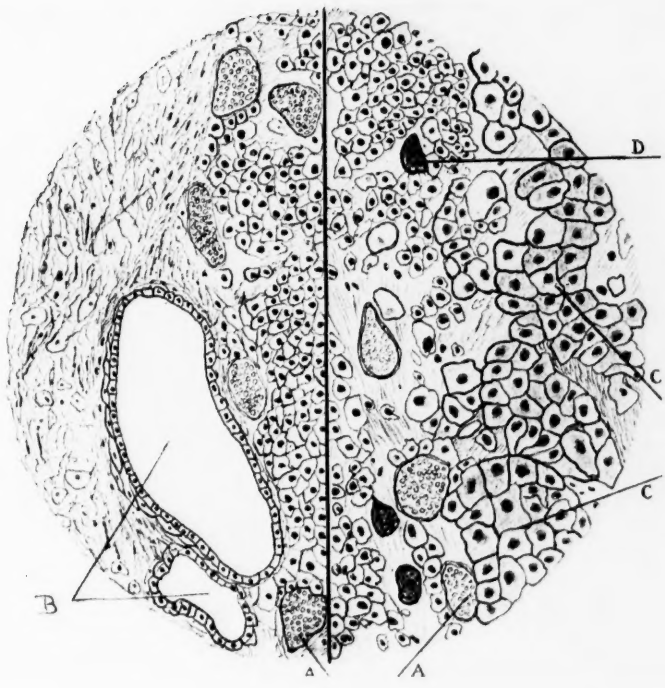
Suprarenal. Sections show little deviation from the normal. The cells of both cortex and medulla stain well. There is no excess of fibrous tissue. Fat globules staining by Scharlach R. are present in large amount. No definite differences between these sections and those from the control case can be demonstrated.



HIGH POWER OF SECTION OF THYROID TUMOUR.

The inter-alveolar cellular proliferation with minute pieces of colloid lying between the cells is shown.

A. Blood vessels. B. Colloid.



SECTIONS OF PITUITARY.

The right half of the section shows pregnancy cells, which stain more or less deeply with eosin. They are most numerous far away from posterior lobe.

The left half shows two colloid alveoli separating the anterior from the posterior portion.

A. Blood vessels.
B. Colloid.
C. Pregnancy (eosinophile) cell.
D. Basiphile.

Pituitary. The difficulty which has been frequently met with in efficiently fixing the tissue was marked in this case. The anterior lobe contains big eosinophile (pregnancy) cells in large numbers. They are arranged in groups surrounding a central cavity as a rule and are most frequently found in the anterior part of this lobe. The basiphile cells are few in number. Large cells whose protoplasm stains very feebly with any stain are frequently seen (? exhausted secreting cells, or ? post mortem change). The colloid is three or four times more abundant than in sections from the control pituitary, but an equal amount is occasionally seen in the pituitary body from normal non-pregnant patients. It is of the clear type; the granular colloid, which is described as being frequently present, is not represented. The colloid is in alveoli lined by cubical epithelium. It stains pink with van Giesen's stain. Sections stained by Scharlach R. show numerous fat globules. Some are present within the cell protoplasm, but they are mostly collected in the connective-tissue spaces. Some of the colloid contains minute globules. The pons nervosa has been invaded by the large eosinophile cells from the anterior lobe.

No conclusions can be drawn from a single case, which is published only to record the fact that in this particular instance the alterations demonstrated in the other ductless glands by the methods employed were extremely slight and in some no changes were demonstrated.

SELECT CLINICAL REPORTS.

(Under this heading are recorded, singly or in groups, cases to which a special interest attaches either from their unusual character or from being, in a special sense, typical examples of their class.)

Vesico-Utero-Vaginal (Juxta-Cervical) Fistula Treated by Inclusion of Cervix in Bladder-Wall.

By Ewen J. Maclean, M.D., M.R.C.P. (Lond.), F.R.S. (Edin.),
Senior Gynæcologist, King Edward VII Hospital, Cardiff, etc.

M.E., aged 40, 8-para, was admitted to the Hospital in June 1908, complaining of incontinence of urine. She was thin, and obviously in ill-health, and was distressed by the incontinence, associated as it was with much local discomfort and soreness. The symptoms had followed on her last confinement five months previously. Enquiries elicited the history that the confinement in question had been prolonged, and ultimately instrumental owing to the presentation of a hydro-cephalic head. The urine was constantly being voided per vaginam since the third or fourth day after the labour.

On examination, the vulva and adjacent parts of the thighs showed the characteristically reddened and excoriated condition. The uterus lay to the front and a juxta-cervical fistula, readily admitting a finger, was present in the anterior fornix and vaginal wall. The anterior lip of the cervix was to some extent split from below upwards and was deficient in substance. The deep-red bladder mucosa bellied through the fistula.

The patient was carefully nursed for a time with a view to rendering the parts more amenable to a plastic operation, and I then performed the usual dissection of the bladder flaps, and after free paring approximating them by silkworm gut sutures. A self-retaining catheter was inserted, and for some days progress was satisfactory. The stitches, however, gradually cut through and the fistula re-opened.

The patient was subsequently discharged, and asked to come to the Hospital for further operation in the course of a couple of months. She presented herself for admission in June of the following year—1909—and asserted that she was willing to undergo any operation to secure relief.

In view of the deficiency of the anterior lip of the cervix and of the presence of the considerable amount of cicatricial tissue in the

margins and neighbourhood of the fistula, I decided to utilize the tissues of the posterior lip, and thus endeavour to close the fistula by turning the cervix into the bladder.

The nature of the operation and the consequential condition, in the event of its being successful, were fully explained to the patient, and a ready assent was given to the procedure.

Urotropin was administered in moderate doses, and for three or four weeks general and local nursing were again carried out.

The second operation was then performed. The bladder margins of the fistula and a somewhat broad ribbon of tissue round the edges of the relatively prominent posterior lip of the cervix were freely pared, and the raw surfaces brought together by six silkworm gut sutures which took a fair grip of the tissues concerned. The os was thus brought into the vesical cavity. The vagina was loosely packed with gauze, and instructions given for two-hourly catheterization. No leakage occurred, the catheter being passed every two or three hours for seven days. At the end of that time the vaginal pack was discontinued, and the clinical note records that the urine was being passed normally. On the tenth day after operation the stitches, all of which had become loosened, were removed.

On the date of the operation the urine was acid and contained no albumen. With the exception of the third day after the operation, when it was alkaline, the reaction remained constantly acid. For the first three days some hæmaturia was observed and occasionally some stringy blood-clots were passed, associated with strangury. The urine then cleared up, but small quantities of pus were observable from the third to the fifth day. A note is made to the effect that the patient menstruated per urethram from the sixth to the eighth day.

The amount of urine collected per catheter for the first seven days varied as much as from twenty-one to forty-nine ounces, but in the early days when the smaller amounts are recorded, a considerable amount was passed independently of the catheter, as there was frequent contractile movement of the bladder.

The vesical retentive capacity steadily improved after the use of the catheter was abandoned, and in the course of a week or ten days the urine was voided some three or four times in the twenty-four hours.

At the time of the patient's discharge from the Hospital, three weeks after the operation, the frequency of micturition was practically normal. The general health rapidly improved; the patient gained considerably in weight, and soon became able to carry out her household duties.

She has now had more than four years' experience of the altered local conditions. The catamenia has generally recurred regularly at monthly intervals. For a few days prior to and also during the

period pelvic discomfort, frequency of micturition and even incontinence are present, but not in anything like a disabling degree. During the period the urine is red or smoky in colour, and shreddy clots are passed, sometimes with dysuria or strangury. Latterly, as many as six or seven weeks may mark the interval, and as the patient is in her 46th year, and has various climacteric symptoms, it may reasonably be expected that ere long she will be relieved of the local discomforts related to the menstruation.

In the intervals between the periods the urine is neutral and gives no albumen reaction, whilst the microscope shows some pus and blood cells, renal epithelium and urate crystals. No casts are to be seen.

Remarks.

Choice of operation. Having regard to the failure of the first operation I am satisfied that, within the limits of my experience of cases of the kind, the method selected was preferable to what would appear to be the remaining practicable alternative, the abdominal section method as recommended by Trendelenburg.

The present condition, both locally and generally, may be regarded as very satisfactory, and, the local abnormality notwithstanding, the operation has established a remarkable improvement.

The prognosis, in so far as it is effected by the operation, will depend on the presence or absence of kidney and bladder complications. In the Review of Current Literature in the *Journal of Obstetrics and Gynæcology,* vol. xv, p. 258, a case of Vineberg's is referred to where a similar operation had been performed and where trouble was experienced subsequently by repeated recurrence of calcareous deposits in the base of the bladder. This possibility has to be borne in mind, but inasmuch as no evidence of such a development has been discerned in the four years since the operation, it may remain a possibility only.

A Case of Exomphalos.

By Daniel O. Twining.

The following case of exomphalos may be of sufficient interest to record:—

The mother was a primipara, aged 26. The pelvic measurements were normal, and the head could be pressed in the pelvic brim. The urine was normal up to two weeks before delivery, but during labour became solid on boiling. The presentation was L.O.A.; labour lasted eleven hours, and was concluded without instrumental interference. The child was full time, a well-developed male, weighing 10 lbs.; no abnormality save the one described was present. The placenta was normal; the cord was once round the neck; it was not short and was pulsating strongly at birth. Protruding from the umbilicus into the base of the cord was a dark tumour, the size of an orange. The sac was dark and glistening, and coils of intestine could be seen through it. The cord was ligatured and cut 4 inches from the hernia; cyanide gauze and a binder were applied.

Next day the child was taken by motor thirty miles to Plymouth, and operated on, 28 hours after birth, by Mr. G. F. Aldons at the South Devon Hospital. The sac was gangrenous and was excised; there were no adhesions; the contents were small intestine and were healthy, and were readily returned into the abdomen. The abdominal wall was sewn up in layers. The other viscera were not enlarged. The child stood the operation well, and for some days promised a successful result, but died on the eighth day after operation from toxæmia.

Pathology. The frequency of this malformation is about 1 in 5,000 births, but usually the child is premature and some other abnormality exists. This child was full time, and a particularly lusty infant. The condition is due to persistent patency of the omphalo-intestinal canal joining the yolk sac with the abdominal cavity. Normally this canal separates at the third month, and the loop of intestine till then present in the canal returns to the abdominal cavity.

Treatment. (1) Operative; the mortality is high. (2) Ahlfeld practises the repeated application under anæsthesia of compresses soaked in alcohol, and binders.

TECHNICAL MEMORANDA.

(Under this heading will be published from time to time notes on points of practical interest in regard to methods of treatment, operative and therapeutic, and on the general management of Obstetrical and Gynæcological cases in hospital and private practice.)

A Combined Anæsthetists' Screen and Instrument Shelf for Use in Abdominal Gynæcological Operations.

By Daniel Dougal, M.D.,

Resident Obstetric Officer, St. Mary's Hospitals, Manchester.

In gynæcological operations where the Trendelenberg position is employed, much inconvenience is often caused to both operator and anæsthetist by sterilized towels and instruments slipping down on to the patient's face, with the result that the asepsis is not so thorough and the administration of the anæsthetic is considerably interfered with.

In order to obviate this difficulty, I have devised the screen shown in the accompanying illustrations, and have found it to answer exceedingly well in practice.

The device consists of a metal platform fixed to the operating table by two vertical supports. The platform is composed of two sections which are hinged together, but capable of being firmly fixed by means of a thumb-screw at each side, one section being attached to the vertical supports by movable joints and so enabling the platform to be raised or lowered as required or lifted back over the patient's head when not in use.

The lower part of each support is bent at a right angle and runs through a metal block attached to the table by means of a pin and provided with a screw on its outer side to fix the support in any desired position.

The screen may therefore be moved backwards or forwards according to the size of the patient or quickly lifted from the table in case of emergency.

When in use, the screen is pushed forwards until the vertical supports are brought against the patient's shoulders, and one section of the platform then lowered till in contact with her chest, the other being adjusted and fixed in a horizontal position to form a shelf over

Fig. 1.

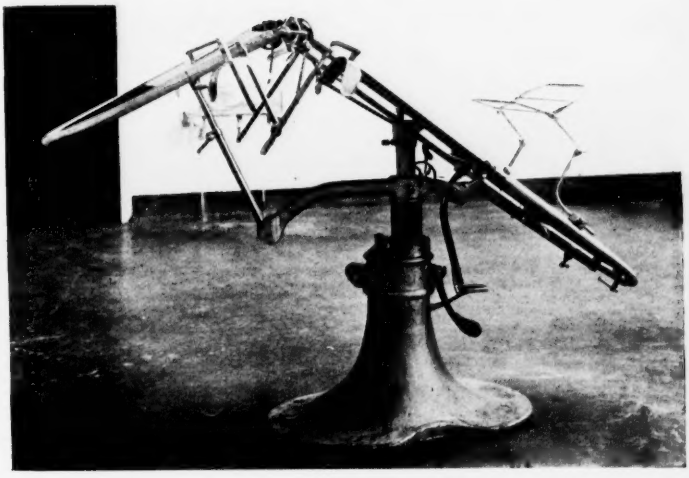


Fig. 2.

Fig. 3.

the patient's head. When the sterile towels are spread over the screen, there is no fear of contamination from contact with the anæsthetist's hands or the patient's face.

In addition, the surgeon has a platform on which to place his instruments without fear of them falling off and in no way encroaches upon the anæsthetist, who is completely shut off from the operation area and has ample room in which to carry on his work.

Figs. 1 and 2 show the screen in position, the table being in the horizontal and Trendelenberg positions respectively.

Fig. 3 gives a very good idea of its appearance when the sterile cloths are arranged over the patient.

It will be noted that they form a hood-like arrangement, providing above, a horizontal platform for the surgeon's instruments, and below a separate compartment where the anæsthetist is able to work with complete freedom.

In the illustrations, the screen[1] is seen attached to a Guyot-Greville table, but with very little modification it may be fitted to any pattern.

1. Messrs. Mayer and Meltzer, of London, are the manufacturers.

REVIEWS OF CURRENT LITERATURE.

UNDER CHARGE OF EARDLEY HOLLAND, M.D.

LIST OF COLLABORATORS:

LONDON Alban Doran, F.R.C.S.; J. B. Banister, M.D.; J. Barris, M.B.; F. E. Taylor, M.D.; C. White, M.D.; J. A. Willett, M.D.; J. Wyatt, F.R.C.S.

EDINBURGH. Miss J. H. Filshill; R. W. Johnstone, M.D.; James Young, M.D.

DUBLIN. R. M. Allan, M.B., Ch.B.

GLASGOW. E. H. L. Oliphant, M.D.

ABERDEEN. W. R. Pirie, M.B.

MANCHESTER. J. S. Young, M.D.; J. Chisholm, M.D.

BIRMINGHAM. H. B. Whitehouse, M.S.; Lewis Graham, M.D.

LIVERPOOL. H. Leith Murray, M.D.

SHEFFIELD. W. W. King, M.B.

DUNDEE. J. A. C. Kynoch, M.B.

CHELTENHAM. C. J. N. Longridge, M.D.

The action of radium and mesothorium on carcinoma uteri.

SCHAUTA (*Monats. f. Geb. u. Gyn.*, Bd. 38, Hft. 5) gives the results of 16 cases. The local effect of radium is speedy disappearance of the tumour masses in the vagina, the walls becoming smooth and soft. The healthy vagina is not affected, though there may be some reddening or epithelial desquamation but never necrosis. The parametrium becomes less infiltrated. Microscopically the cancer cells appear to be disorganised and the typical appearance is completely lost.

As general results many cases suffer from headache, pains in the stomach, intestines and over the bladder, loss of appetite, rises of temperature and diarrhœa alternating with constipation. These occur usually during the application of the radium and quickly disappear during the intervals.

The ill-effects observed were hæmorrhage in two cases, which required vaginal plugging, and bladder and rectal fistulæ.

The indications for radium are: non-operable cases; severe cases before and after operation.

It is contra-indicated in cases of marked cachexia; when there is dense infiltration between the bladder, rectum and vagina, or if fistulæ have already formed.

Small doses may be tried in these cases, but if a marked reaction occurs the treatment must be stopped.

Each case must be treated by itself. The average dose is 40-50 mgrm. It is applied for twelve hours daily for five days, then ten days interval followed by two more series.

Smaller doses gave no results—only a breaking down of the superficial part of the tumour and a fœtid discharge.

Mesothorium was used with poor results. No diminution was observed, only necrosis of the superficial parts. Sixty-six mgrm. were applied for

seven days, followed by an interval of fourteen days, and then another application.

Radium has an action two- or three-fold greater than mesothorium.

Schauta concludes by advocating vaginal hysterectomy, plus radium applications, as being likely to give the best results. R.M.A.

The treatment of infections by means of fixation abscesses.

Dr. de Lostalot (*Lancet*, October 18, 1913) discusses the history of the above method, and says that he is anxious that it should be more widely tried, as it seems of such great value.

He gives the method of producing the abscess and its subsequent treatment, and describes three cases: (1) A case of rupture of an infected extra-uterine pregnancy; (2) Suppuration of the middle finger with extensive lymphangitis and signs of general infection; (3) A case of typhoid fever with severe septicæmic symptoms; and their results. J.M.W.

Sensitized virus vaccination in gonorrhœa and especially its complications.

Louis Cruveilheir (*Lancet*, November 8, 1913). This method of sensitized virus vaccination of Besredka was first applied by the author in the treatments of gonorrhœa and especially its complications.

Most of the work described in this paper has been done on epididymitis and gonorrhœal rheumatism, but Dr. Cruveilheir has also tried it in the treatment of utero-annexal complications with very good results.

J.M.W.

Ossification in operation scar.

Hannes (*Gynækol. Rundschau*, 1913, Hft. 21). The histories of two cases are given. One was a carcinoma of the uterus removed by abdominal hysterectomy and drained by the Mikulicz method. A ventral hernia resulted and on operation the hernial ring was found to be ossified. The other case was a suppurating ovarian cyst which was treated by marsupialisation. The scar was found twenty-two years later to be hard and infiltrated, and this was proved to be due to bone formation. R.M.A.

Formation of an artificial vagina and the ethics of the operation.

Victor Bonney (*Lancet*, October 11, 1913) records a case in which Baldwin's operation was successfully performed for congenital absence of the vagina.

The patient was an unmarried girl of 19, whose engagement had been broken off on account of the deformity, with the result that she became profoundly depressed. Some difficulty was experienced in bringing down the isolated segment of ileum owing to the patient being stout and short.

The author discusses the ethics of the operation. To condemn the unfortunate sufferers from this deformity to abandon for ever the natural hope of some day meeting a companion and support in the battle of life is wrong.

Cases of congenital absence of the vagina may be divided into three groups:—

1. *In children.* The construction of an artificial vagina should never be undertaken, for not until after puberty can a girl's fitness for marriage be estimated nor her wishes on the subject consulted.

2. *In unmarried women.* The bulk of such cases are brought to the

practitioner merely because the menses have failed to appear. A rudimentary condition of the uterus commonly exists as well, but the patient is in the author's experience usually conspicuously healthy. In such, no operation is indicated. The state of affairs ought, however, to be made clear to the mother if possible, and the feasibility of partly overcoming the results of the deformity—should marriage be contemplated—should be explained to her.

There is, however, another class of case in which either (*a*) the deformity is giving rise to physical suffering, owing to retention of menstrual blood in the uterus; (*b*) marriage is in contemplation; or (*c*) the knowledge of the deformity is producing mental symptoms.

As regards (*a*) it would be possible to implant the uterus into the transplanted segment of ileum, or Pfannensteil's operation might be performed, but if the uterus and tubes be disorganised by the retained blood it is better to remove them.

In (*b*), careful enquiry must be made as to the girl's fitness for marriage, and both her wishes and those of her parents must be consulted after full explanation of the limitations and risks of the operation. As regards the fiancé, the medical man should explain to him the state of affairs. Where a consensus of opinion is arrived at by the interested parties, the operation is justifiable.

In (*c*), of which class the case recorded by the author is an example, if the girl and her parents are agreed in desiring the operation, it is right to perform it.

3. *In married women.* Remedial measures may be sought: (*a*) as a sheer act of self-sacrifice on the woman's part, she herself having no sexual desire; or (b) to satisfy the sex sense of both wife and husband.

As regards class (*a*), the author holds that where the patient asks for the operation solely under pressure of her husband's desires, both the latter and the surgeon who performs it incur a very grave responsibility.

In class (*b*), however, if the nature of the operation is approved by the parties concerned, it is entirely justifiable to carry it out.

Relationship of the peritoneum to the fundus uteri.

La Torre (*Gynækol. Rundschau,* 1913, Hft. 20). The author has endeavoured to discover why the peritoneum is so adherent to the fundus of the uterus. After examining the uteri of bitches he has come to the following conclusions: the peritoneum consists of two layers, a cellular and a ground substance composed of connective tissue and elastic fibres. The latter passes down into the uterine musculature and splits up until it is in intimate connection with the muscle fibres. Hence the impossibility of endeavouring to separate peritoneum and fundus uteri.

The article is well illustrated with stained sections of the uterine wall.

R.M.A.

The treatment of retroflexion of the uterus.

Caballero (*Revue de Gyn. et de Chirug. Abdom.,* November, 1913) gives details of a method which has been used with success in 350 cases without any mortality.

He suspends the uterus by inserting the round ligaments into the abdominal wall. This is done by passing a pair of forceps between the rectus muscle and the aponeurosis covering it till the outer border of the rectus is reached, the forceps is then pushed into the peritoneal cavity near the internal abdominal ring, and seizes the round ligament about seven

centimeters from its insertion into the uterus. The same is done on the opposite side and then the loop of round ligament is stitched to the aponeurosis.

He claims that it is a superior operation to the usual suspension in the middle line by the round ligaments, as by this method the round ligaments pierce the anterior abdominal wall some five centimeters from the middle line and get a new insertion into rectus muscle. C.W.

The etiology of genital prolapse.

JASCHKE (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxiv, Hft. 2 and 3) discusses the clinical and anatomical features of prolapse. He concludes that the two great means of support of the uterus—the condensed connective tissue bands which sling it, and the pelvic floor which supports it—are essentially parts of one whole, either functionally or anatomically considered. Any one-sided consideration of the two parts leads to error. In the etiology of prolapse congenital or acquired changes in the condensed connective tissue play a rôle of equal importance with changes in the musculature and fascia—whether the case be one of congenital wideness of the "hiatus genitalis," or innate weakness of the levator ani, or traumatic insufficiency of the muscles of the pelvic floor. Clinical, as well as anatomical considerations, point to insufficiency of the pelvic floor as being more significant in the causation of prolapse than interference with the "ligaments." Frequently the same injury affects both means of support, and it becomes largely a matter of taste which one regards as primary, and which secondary. Slight ligamentous insufficiency appears to lead to cystocele of the first and second degrees, and perhaps to slight descent of the uterus, but true prolapse of the uterus is impossible without insufficiency of the levator ani, either congenital or acquired. R.W.J.

The visceral complications met with in hysterectomy for fibroids.

SIR JOHN BLAND-SUTTON (*Lancet*, November 1, 1913). Under the above title the author discusses the following complications and the best methods of dealing with them.

1. Cardiac lesions.
2. Diseases of the thyroid gland.
3. Diabetes.
4. Diseases of the kidney.
5. Cancer of the colon.
6. Gall-stones.

And concludes by saying, "We are anxious to obtain the experience of those who perform hysterectomy for fibroids in relation to such complicating conditions as the above." J.M.W.

Ovarian and parovarian tumours.

EKLER (*Monats. f. Geb. u. Gyn.*, Bd. 38, Hft. 5). This is a detailed account of 211 cases operated upon in the Rothschild hospital in Vienna. 166 were innocent and 45 malignant. The mortality was 7.3 innocent and 4 malignant. R.M.A.

Experimental glycosuria in pregnant and non-pregnant women.

JAEGER (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxiv, Hft. 2 and 3) found glycosuria in 42 out of 400 cases of pregnancy—roughly 10 per cent. The sugar was

always present in only a small quantity. He found experimentally that it was easier to produce glycosuria by administration of adrenalin in pregnant women than in non-pregnant. R.W.J.

The use of retro-placental and umbilical vein blood for the diagnosis of syphilis by the Wassermann reaction.

KRUKENBERG (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxiv, Hft. 2 and 3) has tested the use of blood from these sources in connection with the Wassermann reaction. He finds that the serum of retro-placental blood alone is not serviceable for a diagnosis of maternal syphilis as the reaction is positive in 30 per cent. of healthy patients, in 36 per cent. of cases of pathological labour, in 46 per cent of prolonged labour, especially with severe pains, and in 55 per cent. of eclampsias. This positive reaction is probably due to the presence of albuminoid-lipoid compounds.

Blood from the umbilical vein may be used for testing the presence of hereditary syphilis in infants. The result is always accurate, and the method is one applicable alike to institutional and private practice.

R.W.J.

Some applications of antenatal eugenics in heredity.

D. BERRY HART (*Lancet*, October 18, 1913), in a Post Graduate Lecture at Edinburgh, first discusses the term "Eugenics" and its meaning, and then continues under the following headings :—

1. Heredity and variation.
2. The origin of the hereditary cells.
3. The determinants of heredity.
4. Mendelism.
5. Points on antenatal eugenics.
6. Transmission of characteristics.
7. The relation of Evolution to Darwinism, Weismannism, and Mendelism.
8. The grouping of conditions :
   (*a*) Inherent in the germ plasma.
   (*b*) Due to loss of determinants.
9. The question of marriage.
10. Legislation and education.

He concludes by giving his views on the way in which further work may be carried out with advantage, and says : " The present generation of medical men has received from some of its predecessors, Simpson, Lister, Pasteur, Koch, to name the dead immortals only, any immense accession of knowledge, and in our daily practice and investigation we unconsciously pay a tribute to their genius. Future generations will be more in the debt of the great evolutionists Lamarck, Darwin, Wallace, Weismann, Mendel, Galton, who have laid the foundations of our knowledge of evolution and eugenics, so that the future of our race may be that of one whose ideal is—*Mens sana in corpore sano.*" J.M.W.

Bicornute uterus with full term pregnancy.

OHMAN (*Gynækol. Rundschau*, 1913, Hft. 20). The patient had been operated upon previously as a case of extra-uterine pregnancy. After this she became pregnant and went to term. Labour was uneventful. The

fœtus lay in the right horn; the left could be felt below and behind above the promontory.

The author discusses the treatment and the liability to uterine rupture.

R.M.A.

Symmetrical necrosis of the cortex of the kidneys. Associated with suppression of urine in women shortly after delivery.

H. D. Rolleston (*Lancet*, October 25, 1913) first gives two tables of particulars of the 11 reported cases, afterwards discussing the clinical features of the cases.

He then goes on to the morbid lesion found, with special reference to the vascular changes, and the cause of the thrombosis in the renal vessels.

Having remarked on the symptoms and summarized this part of the paper he gives the history of his own case, with a full account of the P.M. examination and the pathological reports.

J.M.W.

The treatment of labour in contracted pelvis.

Professor v. Herff (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxiv, Hft. 2 and 3), in a foreword to a statistical article by Cuny, explains the principles governing his treatment of contracted pelvis. The most important object is to secure a spontaneous, non-operative delivery, and in the more marked degrees of contraction to employ the induction of premature labour with this end in view. Acting on these lines, he has in about 500 cases secured 81 per cent. of spontaneous deliveries, and including those following induction of labour 88.7 per cent. Apart from the use of such physiological aids as the Walcher position, he regards induction of premature labour as the most important method of treatment. It was employed in 160 cases amongst those under notice, whereas operative enlargement of the pelvis—in every case subcutaneous hebosteotomy—was only performed 18 times. Owing to the fact that the maternal and fœtal mortality of the latter operation range about 2 per cent. and 5 per cent. respectively, the author prefers Cæsarean section, which gives the child a better chance and the mother as good a one.

Professor v. Herff employs Müller's method of estimating the proper time for induction, and he also emphasizes the value of finding the ratio of the greatest distance between the child's head (anteriorly) and the spine of the fifth lumbar vertebra to the external conjugate. The former measurement he calls the "Rücken-Kopfmass" or RK. If the RK is equal to or smaller than the external conjugate, the head will enter the brim. If it is only 1 cm. larger it will enter by the aid of Walcher's position. If the RK is 3 cm. larger than the external conjugate spontaneous labour is not to be expected, while cases in which the excess is not more than 2 cm. are those in which a long experience is of the greatest help in determining the treatment to be adopted.

Eighty per cent. of the infants left the hospital alive after induction of labour. The method used was rupture of the membranes. The introduction of bougies he regards as unsuitable for general practice. Pituitary extract may be given to hasten the onset of pains.

The author regards high forceps as a last resort. He states that he has never had to perform craniotomy on the living normal child in the whole of his life.

R.W.J.

REPORTS OF SOCIETIES.

MIDLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Birmingham, October 17, 1913.

The Annual Meeting of the Society was held at the Medical Institute, Edmund Street, Birmingham, on Friday, October 17, 1913, at 4-30 p.m., Dr. MALINS, President, occupying the Chair.

There were present 13 members and 8 visitors.

The Hon. General Secretary read the Annual Report of the Society for the Session 1912-13.

The Society at present includes 71 members, constituted as follows: Original members 43, members elected during the past session 28. Five meetings have been held as under: at Birmingham, three meetings; at Bristol, one meeting; at Leicester, one meeting. The average attendance at these meetings was as follows: Members, 12.6; Visitors, 3.6.

At the invitation of the North of England Obstetrical and Gynæcological Society, a combined meeting was held with the Edinburgh, Glasgow, and North of England Societies, at Manchester, on May 30 and 31, 1913. The Council desires to acknowledge with thanks the hospitality of the North of England Society upon this occasion.

The Society has arranged with the *Journal of Obstetrics and Gynæcology of the British Empire* and the Publishers of the same, for the publication of the Society's Transactions for the past year. A Volume of Proceedings and Transactions has been published and a copy sent to each member of the Society.

The Council desire to point out that the publication of Transactions, in the case of a Society which includes members in many different localities, is extremely important. At the same time they wish it to be understood that it can only be done under the existing annual subscription (5/-) if the membership of the Society is considerably increased. At least 100 new members are required in order to place the publication of Transactions upon a firm basis. Without the accession of new members, the Council fear that it may be necessary to suspend the publication of the Volume of Transactions for a year or so, until the necessary funds accumulate.

The adoption of the Annual Report was proposed by Dr. Edge, seconded by Dr. Smallwood Savage, and carried unanimously.

The Honorary Treasurer communicated his report upon the financial position of the Society. Its adoption was proposed by Dr. William Smith, seconded by Dr. Lewis Graham, and carried *nem. con.*

The following officers and Council were elected to serve for the Session 1913-14. *President:* Walter Swayne, M.D. *Vice-Presidents:* Christopher Martin, F.R.C.S., Ewen J. Maclean, M.D., and H. T. Hicks, F.R.C.S.

Council: Guy J. Branson, M.D., Annie Clark, M.D., E. Tenison Collins, M.R.C.S., Frederick Edge, F.R.C.S., J. Furneaux Jordan, F.R.C.S., Edward Malins, M.D., Cecil Marriott, F.R.C.S., W. H. Newnham, M.B., Miles H. Phillips, F.R.C.S., Thomas Wilson, M.D., and William Smith, F.R.C.S.

Hon. Treasurer: C. E. Purslow, M.D.

Hon. General Secretary: Beckwith Whitehouse, M.S.

Hon. Local Secretaries: For Western Counties: D. C. Rayner, F.R.C.S. For Eastern Counties: T. Clare, F.R.C.S.

The PRESIDENT (Dr. Swayne) then delivered his Presidential address upon "The Relations between Universities and Medical Science."

A vote of thanks to the President for his interesting address was proposed by Dr. Malins, seconded by Dr. Newnham, and carried unanimously.

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